

Petition for Expedited CLC Consideration of Perfluorooctanic Acid (PFOA)

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Petitioners for Expedited CLC Consideration of PFOA

- **United Steel, Paper and Forestry, Rubber, Manufacturing, Energy, Allied Industrial and Service Workers International Union**
- **AFL-CIO, CLC**
- **Sierra Club**
- **Environmental Law Foundation**
- **Environmental Working Group**
- **U.S. Public Interest Research Group**
- **Environment California**
- **Natural Resources Defense Council**



Petitioner's Basis for Expedited Consideration

- **Causes cancer at multiple sites in animals**
- **U.S. EPA Science Advisory Board (SAB)**
 - Likely human carcinogen
- **Ongoing public debate about the level of cancer risk**
- **Widespread consumer exposure in California**
 - PFOA detected in blood in children and adults



U.S. EPA and its Science Advisory Board

- **U.S. EPA Draft Risk Assessment**
 - Jan. 4, 2005: *“Suggestive evidence of carcinogenicity, but not sufficient to assess human carcinogenic potential”*
- **SAB Review**
 - May 30, 2006: *“Likely to be carcinogenic to humans”*
- **U.S. EPA response to SAB:**
 - June 20, 2006: Integrate new toxicity testing; seek second SAB review
- **U.S. EPA PFOA Global Stewardship Program**
 - Jan. 25, 2006: Voluntary reduction of 95% of PFOA releases and presence in products by 2010, elimination by 2015
- **U.S. EPA nominates for testing by NTP a class study of perfluorosulfonates, carboxylic acids and telomers**
 - Aug. 7, 2003: Toxicity of PFOA “includes liver toxicity, immunotoxicity, cancer (liver, pancreatic, and Leydig cell tumors), and developmental toxicity”

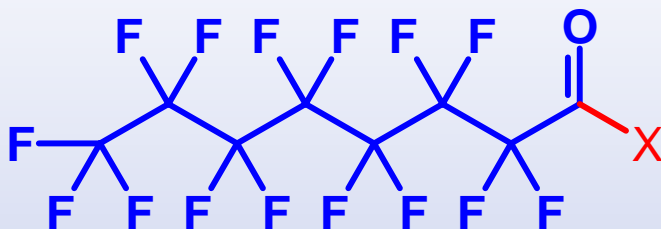


Perfluorooctanoic Acid (PFOA) & Perfluorooctane Sulfonate (PFOS)

PFOA

Formula: $\text{C}_8\text{HF}_{15}\text{O}_2$

Structure:



Free acid

$\text{X} = \text{OH}$

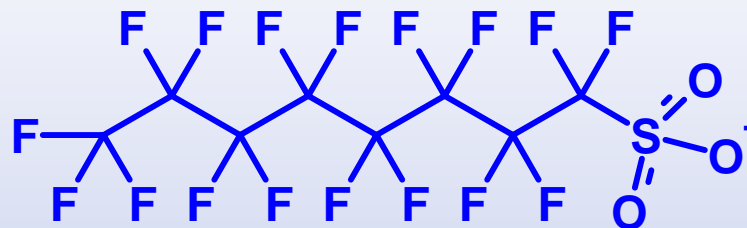
Ammonium salt

$\text{X} = \text{ONH}_4$

PFOS

Formula: $\text{C}_8\text{F}_{17}\text{O}_3\text{S}^-$

Structure:



Uses of PFOA and its Salts

- **Production of fluoroelastomers & fluoropolymers**
 - Polytetrafluoroethylene (Teflon®)
 - Polyvinylidene fluoride
- **Consumer products**
 - Coatings on paper, textiles, carpet
 - Personal care products
 - Nonstick coatings on cookware
- **Industrial sectors**
 - Automotive
 - Aerospace
 - Chemical
 - Electrical
 - Electronic
 - Medical
 - Building/construction



PFOA & PFOS Exposure

- **Worldwide distribution – increasing levels in:**
 - Soil, water, and air
 - Wildlife and general population
- **Very stable in the environment**
 - No known environmental breakdown mechanism for PFOA
- **Persistent in humans**
 - Not metabolized
 - High affinity for proteins
 - Distributes to liver, plasma, and kidney
 - Enterohepatic circulation
 - PFOA human serum elimination half-life: ~4 years



PFOA in the U.S. Population

NHANES 2001-2002, Mean Levels

	ng/mL (ppb)
➤ Men	
— Non-Hispanic white	6.98
— Non-Hispanic black	3.62
— Mexican American	2.89
➤ Women	
— Non-Hispanic white	3.97
— Non-Hispanic black	2.85
— Mexican American	2.08

Calafat et al. 2006



Human Cancer Epidemiology

- **Retrospective cohort mortality studies of fluorochemical production workers**
 - Minnesota: Gilliland and Mandel (1993), as reported by U.S. EPA
 - Increased risk of prostate cancer correlated with employment duration
 - Different exposure metric in follow-up, no increase in prostate cancer reported (Alexander et al., 2001)
 - West Virginia: DuPont (2003), as interpreted by U.S. EPA
 - Increased bladder and kidney/urinary cancer
- **SAB: “human data are ambiguous”**



Long-term Feeding Studies* in SD Rats

(as reported by U.S. EPA SAB)

“3M Study”: male and female rats (Sibinski, 1987)

- Testes: Leydig cell tumors
- Liver: Hyperplastic nodules in high dose males
- Pancreas: Acinar cell hyperplasia
- Mammary: Fibroadenoma

“DuPont Study”: male rats (Cook et al., 1994; Biegel et al., 2001)

- Testes: Leydig cell tumors
- Liver: Adenomas
- Pancreas: Acinar cell adenomas; progression to carcinoma observed

*administering PFOA ammonium salt



Mechanistic Issue

- **U.S. EPA postulated peroxisome proliferator-activated receptor alpha (PPAR-alpha) agonism mode of action (MOA) for:**
 - Tumor triad (liver adenomas, Leydig cell tumors, pancreatic acinar tumors)
- **SAB concluded:**
 - Consolidation of liver, Leydig cell and pancreatic tumors into a triad MOA is not justified
 - Available evidence inadequate to support PPAR-alpha MOA for Leydig cell and pancreatic acinar tumors
 - PPAR-alpha MOA is plausible for liver tumors, but insufficient data exist to conclude that this is the sole mechanism in liver



Conclusion

- **Eleven groups petitioned for expedited CIC consideration of PFOA**
- **Primary basis cited by petitioner:**
 - U.S. EPA SAB finding that PFOA is likely human carcinogen
 - “causes liver, pancreatic and testicular cancer in animals”
 - Widespread human exposure; persistence in human tissue
- **U.S. EPA status**
 - U.S. EPA will revise the assessment
 - Revised assessment will undergo US EPA SAB review
 - US EPA requested NTP test perfluorinated compounds
- **Other Authoritative Bodies**
 - NTP studying perfluorinated compounds per EPA request
 - A 4-week pharmacokinetic study is being planned for PFOA
- **CIC discussion:**

Should PFOA be considered at a future meeting for potential listing as known to cause cancer?

